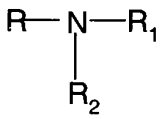
In the Claims:

Please cancel claims 60-62 and 85-87 without prejudice.

Please amend the claims as follows. A "strike-through version" of the amended claims is appended to the response. Applicant submits that the amendments made to the claims were made to correct claim drafting errors and to further define the scope of the claims. The amendments were not made in response to the cited art.

48. (amended) A nanocomposite comprising an organoclay which has been exfoliated into a polymer matrix, the organoclay being the reaction product of a smectite clay with a quaternary ammonium component, wherein the quaternary ammonium component is derived from a process comprising:

mixing at a temperature of about 70 °C a C_{12}-C_{22} fatty acid or mixture of fatty acids having an iodine value of from about 3 to about 90, with an alkanolamine of the formula:



wherein R, R_1 and R_2 are independently selected from C_2-C_6 hydroxyalkyl groups, and wherein the molar ratio of the fatty acid to the alkanolamine is from about 1.4 to about 2.0,

increasing the temperature of the mixture of the fatty acid and the alkanolamine from about 70 °C to a range of from about 170 °C to about 250 °C, wherein the rate of temperature increase is maintained at an average rate of greater than about 0.4 °C per

minute to produce a mixture of about 55 wt % of a diester compound and less than about 25 wt % of a triester compound; and

E1 cont.

alkylating the produced diester and triester compounds to form the quaternary ammonium component.

49. (amended) The nanocomposite of claim 48, wherein the rate of temperature increase is maintained at an average rate greater than about 0.8 °C per minute.

50. (amended) The nanocomposite of claim 48, wherein the fatty acid is a C_{16}-C_{22} fatty acid having an iodine value of from about 40 to 60.

51. (amended) The nanocomposite of claim 48, wherein the fatty acid is a C_{16}-C_{22} fatty acid having an iodine value of from about 45 to 55.

52. (amended) The nanocomposite of claim 48, wherein the fatty acid is derived from tallow, soy, palm, palm kernel, rape seed, canola, tall oil, lard or mixtures thereof.

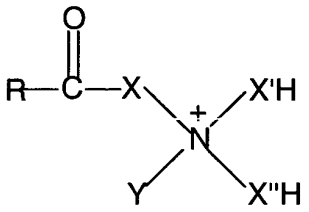
53. (amended) The nanocomposite of claim 48, wherein the alkanolamine is selected from the group consisting of triethanolamine, propanol diethanolamine, ethanol diisopropanolamine, triisopropanol amine, diethanolisopropanol amine, ethanoldiisobutanolamine, diethanolisobutanolamine and mixtures thereof.

54. (amended) The nanocomposite of claim 48, wherein the molar ratio of the fatty acid to the alkanolamine is in the range of from about 1.60 to 1.90.

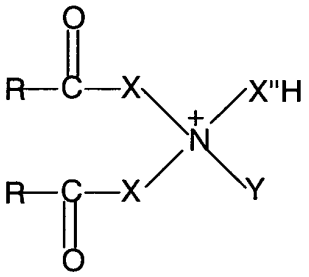
55. (amended) The nanocomposite of claim 48, wherein the molar ratio of the fatty acid to the alkanolamine is in the range of from about 1.68 to 1.72.

57. (amended) The nanocomposite of claim 48, wherein the alkylating agent is selected from the group consisting of methyl chloride, benzyl chloride, ethyl chloride, diethyl sulfate, dimethyl carbonate, trimethyl phosphate, dimethyl sulfate and mixtures thereof.

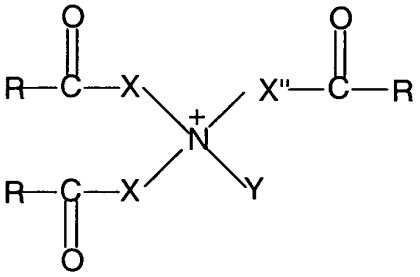
58. (amended) A nanocomposite comprising an organoclay which has been exfoliated into a polymer matrix, the organoclay being the reaction product of a smectite clay with a quaternary ammonium component, the quaternary ammonium component comprising a monoester compound of formula (I), a diester compound of formula (II), and a triester compound of formula (III):



Z^- I)



Z^- II)



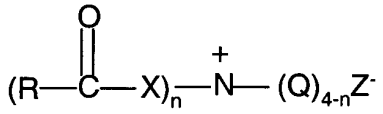
Z^- III)

E2 cont.

wherein X, X' and X'' are the same or different and are selected from straight or branched chain, oxyalkylene or polyoxyalkylene groups having from 2-6 carbon atoms where the oxyalkylene units number from about 1-10, each R group is individually selected from straight or branched chain alkyl or alkylene groups having from 11 to 23 carbon atoms, Y is and alkylphenyl group or a straight or branched chain C_1 to C_6 alkyl or alkylene group; and Z- represents a halogen or sulfate;

wherein the diester compound comprises greater than about 55 wt.% of the quaternary ammonium component and wherein the triester compound comprises less than about 25 wt.% of the quaternary ammonium component.

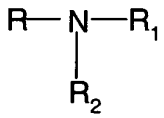
59. (amended) A nanocomposite comprising an organoclay which has been exfoliated into a polymer matrix, the organoclay being the reaction product of a smectite clay with a quaternary ammonium component, the quaternary ammonium component comprising one or more compounds having the general formula (IV):



wherein n is an integer from 1 to 2, R is a C_5 to C_{23} straight or branched chain alkyl or alkylene group, each X can be the same or different and is selected from straight or branched chain oxyalkylene or polyoxyalkylene groups having from 2-6 carbon atoms; each Q can be the same or different and is selected from a oxyalkylene or polyoxyalkylene group, or straight or branched chain alkyl, alkylene, alkyl phenyl, hydroxyalkyl, or hydroxyalkylene group, where at least one of said Q groups is a C_2 to C_6 linear or branched chain oxyalkylene or polyoxyalkylene capped with a C_1 to C_6 alkyl, or an alkyl phenyl group; and Z^- is a halogen or sulfate.

64. (amended) A nanocomposite comprising an organoclay which has been exfoliated into a polymer matrix, the organoclay being the reaction product of a smectite clay with a quaternary ammonium component, wherein the quaternary ammonium component is derived from a process comprising:

reacting a C_{11}-C_{23} fatty acid or mixture of fatty acids having an iodine value of from about 20 to about 90, with an ether alkanolamine of the formula:



where R is a C_2-C_6 alkyl ether, and each of R_1 and R_2 is independently selected from C_2-C_6 hydroxyalkyl groups, and wherein the molar ratio of the fatty acid to the ether alkanolamine is from about 1.4 to about 2.0; and

alkylating the product of the reaction of the fatty acid with the ether alkanolamine with an alkylating agent to form the quaternary ammonium component.

65. (amended) The nanocomposite of claim 64, wherein the fatty acid is a C_{16}-C_{22} fatty acid having an iodine value of from about 40 to 60.

66. (amended) The nanocomposite of claim 64, wherein the fatty acid is derived from tallow, soy, palm, palm kernel, rape seed, canola, tall oil, lard or mixtures thereof.

67. (amended) The nanocomposite of claim 64, wherein the ether alkanolamine is selected from the group consisting of methoxyethyldiethanolamine, methoxypropyldiethanolamine. methoxybutyldiethanolamine and mixtures thereof.

E3 Cont.

68. (amended) The nanocomposite of claim 64, wherein the molar ratio of fatty acid to ether alkanolamine is in the range of from about 1.60 to about 1.90.

69. (amended) The nanocomposite of claim 64, wherein the alkylating agent is selected from the group consisting of methyl chloride, benzyl chloride, ethyl chloride, diethyl sulfate, dimethyl carbonate, trimethyl phosphate, dimethyl sulfate or mixtures thereof.

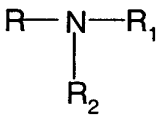
70. (amended) The nanocomposite of claim 64, wherein the alkylating agent is methyl chloride.

71. (amended) The nanocomposite of claim 64, wherein the process is conducted in the presence of a solvent.

72. (amended) The nanocomposite of claim 64, wherein the process is conducted in the presence of a solvent, wherein the solvent is selected from the group consisting of C_1-C_6 alcohols, glycols, fatty acid, mono-, di-, or tri-glycerides, and mixtures thereof.

73. (amended) An organoclay comprising the reaction product of a smectite clay with a quaternary ammonium component, wherein the quaternary ammonium component is derived from a process comprising:

mixing at a temperature of about 70 °C a C_{12}-C_{22} fatty acid or mixture of fatty acids having an iodine value of from about 3 to about 90, with an alkanolamine of the formula:



wherein R, R_1 and R_2 are independently selected from C_2-C_6 hydroxyalkyl groups, and wherein the molar ratio of the fatty acid to the alkanolamine is from about 1.4 to about 2.0,

E3 cont.

increasing the temperature of the mixture of the fatty acid and the alkanolamine from about 70 °C to a range of from about 170 °C to about 250 °C, wherein the rate of temperature increase is maintained at an average rate of greater than about 0.4 °C per minute to produce a mixture of about 55 wt % of a diester compound and less than about 25 wt % of a triester compound; and

alkylating the produced diester and triester compounds to form the quaternary ammonium component.

74. (amended) The organoclay of claim 73, wherein the rate of temperature increase is maintained at an average rate greater than about 0.8 °C per minute.

75. (amended) The organoclay of claim 73, wherein the fatty acid is a C_{16}-C_{22} fatty acid having an iodine value of from about 40 to 60.

76. (amended) The organoclay of claim 73, wherein the fatty acid is a C_{16}-C_{22} fatty acid having an iodine value of from about 45 to 55.

77. (amended) The organoclay of claim 73, wherein the fatty acid is derived from tallow, soy, palm, palm kernel, rape seed, canola, tall oil, lard or mixtures thereof.

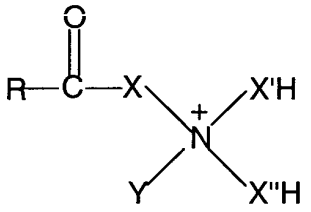
78. (amended) The organoclay of claim 73, wherein the alkanolamine is selected from the group consisting of triethanolamine, propanol diethanolamine, ethanol diisopropanolamine, triisopropanol amine, diethanolisopropanol amine, ethanoldiisobutanolamine, diethanolisobutanolamine and mixtures thereof.

79. (amended) The organoclay of claim 73, wherein the molar ratio of the fatty acid to the alkanolamine is in the range of from about 1.60 to 1.90.

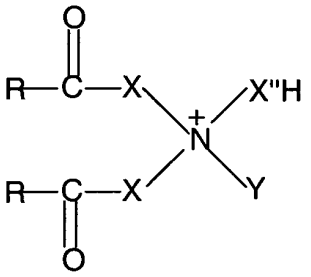
80. (amended) The organoclay of claim 73, wherein the molar ratio of the fatty acid to the alkanolamine is in the range of from about 1.68 to 1.72.

82. (amended) The organoclay of claim 73, wherein the alkylating agent is selected from the group consisting of methyl chloride, benzyl chloride, ethyl chloride, diethyl sulfate, dimethyl carbonate, trimethyl phosphate, dimethyl sulfate and mixtures thereof.

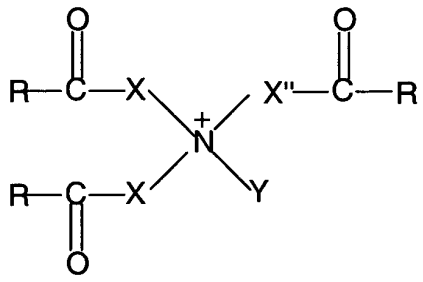
83. (amended) An organoclay comprising a reaction product of a smectite clay with a quaternary ammonium component, the quaternary ammonium component comprising a monoester compound of formula (I), a diester compound of formula (II), and a triester compound of formula (III):



Z^- I)



Z^- II)



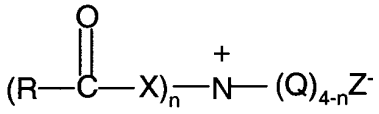
Z^- III)

E4 Cont.

wherein X, X' and X'' are the same or different and are selected from straight or branched chain oxyalkylene or polyoxyalkylene groups having from 2-6 carbon atoms, where the oxyalkylene units number from about 1-10, each R group is individually selected from straight or branched chain alkyl or alkylene groups having from 11 to 23 carbon atoms, Y is and alkylphenyl group or a straight or branched chain C_1 to C_6 alkyl or alkylene group; and Z- represents a halogen or sulfate;

wherein the diester compound comprises greater than about 55 wt.% of the quaternary ammonium component and wherein the triester compound comprises less than about 25 wt.% of the quaternary ammonium component.

84. (amended) An organoclay comprising the reaction product of a smectite clay with a quaternary ammonium component, the quaternary ammonium component comprising one or more compounds having the general formula (IV):



wherein n is an integer from 1 to 2, R is a C_5 to C_{23} straight or branched chain alkyl or alkylene group, each X can be the same or different and is selected from straight or branched chain, oxyalkylene or polyoxyalkylene groups having from 2-6 carbon atoms; each Q can be the same or different and is selected from a oxyalkylene or polyoxyalkylene group, or straight or branched

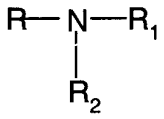
E4 Cont'

chain alkyl, alkylene, alkyl phenyl, hydroxyalkyl, or hydroxyalkylene group, where at least one of said Q groups is a C_2 to C_6 linear or branched chain oxyalkylene or polyoxyalkylene capped with a C_1 to C_6 alkyl, or an alkyl phenyl group; and Z^- is a halogen or sulfate.

E5

89. (amended) An organoclay comprising a reaction product of a smectite clay with a quaternary ammonium component, wherein the quaternary ammonium component is derived from a process comprising:

reacting a C_{11}-C_{23} fatty acid or mixture of fatty acids having an iodine value of from about 20 to about 90, with an ether alkanolamine of the formula:



where R is a C_2-C_6 alkyl ether, and each of R_1 and R_2 is independently selected from C_2-C_6 hydroxyalkyl groups, and wherein the molar ratio of the fatty acid to the ether alkanolamine is from about 1.4 to about 2.0; and

alkylating the product of the reaction of the fatty acid with the ether alkanolamine with an alkylating agent to form the quaternary ammonium component.

90. (amended) The organoclay of claim 89, wherein the fatty acid is a C_{16}-C_{22} fatty acid having an iodine value of from about 40 to 60.

91. (amended) The organoclay of claim 89 wherein, the fatty acid is derived from tallow, soy, palm, palm kernel, rape seed, canola, tall oil, lard or mixtures thereof.

E5 Cont

92. (amended) The organoclay of claim 89 wherein, the ether alkanolamine is selected from the group consisting of methoxyethyldiethanolamine, methoxypropyldiethanolamine, methoxybutyldiethanolamine and mixtures thereof.

93. (amended) The organoclay of claim 89 wherein, the molar ratio of fatty acid to ether alkanolamine is in the range of from about 1.60 to about 1.90.

94. (amended) The organoclay of claim 89, wherein the alkylating agent is selected from the group consisting of methyl chloride, benzyl chloride, ethyl chloride, diethyl sulfate, dimethyl carbonate, trimethyl phosphate, dimethyl sulfate or mixtures thereof.

95. (amended) The organoclay of claim 89, wherein the alkylating agent is methyl chloride.

96. (amended) The organoclay of claim 89, wherein the process is conducted in the presence of a solvent.

97. (amended) The organoclay of claim 89, wherein the process is conducted in the presence of a solvent, wherein the solvent is selected from the group consisting of C_1-C_6 alcohols, glycols, fatty acid, mono-, di-, or tri-glycerides, and mixtures thereof.

Please enter the following claims:

E6

112. (new) The nanocomposite of claim 64, wherein the fatty acid has less than about 20% trans isomer.

113. (new) The nanocomposite of claim 64, wherein the alkyl ether is selected from a group consisting of, methoxyethyl ether, methoxypropyl ether, methoxybutyl ether and mixtures thereof.

114. (new) The nanocomposite of claim 64, wherein the hydroxyalkyl group is selected from a group consisting of ethanol, propanol, isopropanol, isobutanol and mixtures thereof.

115. (new) The organoclay of claim 84, wherein the alkyl ether is selected from a group consisting of, methoxyethyl ether, methoxypropyl ether, methoxybutyl ether and mixtures thereof.

116. (new) The organoclay of claim 84, wherein the fatty acid has less than about 20% trans isomer.

117. (new) The organoclay of claim 84, wherein the hydroxyalkyl group is selected from a group consisting of ethanol, propanol, isopropanol, isobutanol and mixtures thereof.

Response to Office Action Mailed September 11, 2002

A. Claims In The Case

Claims 48-55, 57-59, 64-74, 76-80, 82-84 and 89-97 have been amended. Claims 1, 4-13, 15-20 31-33, 35-41 and 45 have been rejected. Claims 1, 4-13, 15-20 31-33, 35-41, 45, 48-69, 63-84 and 88-117 are pending. Claims 112-117 are new.

B. Objections

The amended specification has been objected to under 35 U.S.C. 132 for entering new matter. Applicant respectfully disagrees with the objections.

The Examiner states, "Newly submitted specification contains numerous new matter issues on almost every page of the specification." Applicant respectfully disagrees with the objection. "Mere rephrasing of a passage does not constitute new matter. Accordingly, a rewording of a passage where the same meaning remains intact is permissible." *In re Anderson*, 471 F.2d 1237, 176 USPQ 331 (CCPA 1973). Amendments to the specification merely render explicit what had been implicitly disclosed originally, and while new language has certainly been

added, we are not prone to view all new 'language' ipso facto as 'new matter'. *In re Wright*, 343 F2d 761, 767, 145 USPQ 182, 188 (CCPA 1934).

The Examiner also states, "Change of 'transfer rate greater than' to 'maybe greater', another change is from 'must' to may in many circumstances' or 'this because' to 'it is believed' or from 'hydrogenated tallow' to 'tallow' which chemically is a different compound or from 'relatively inadequate' to 'less efficient' where something that was previously inadequate may now be used." Applicant respectfully disagrees with the objections, however, to expedite prosecution, Applicant has cancelled the above-mentioned changes to the specification.

C. The Claims Are Described Pursuant To 35 U.S.C. § 112, First Paragraph

Claims 1-111 were rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant respectfully disagrees.

Claims 48 and 73 were rejected as "reciting fatty acids having a C_{12}-C_{23} carbon atoms." Claims 48 and 73 have been amended for clarification.

Claims 59 and 84 recite in part, "R is a C_5 to C_{23} straight or branched chain." Support for the carbon numbers is found in Applicant's original specification, which states,

> In another embodiment, the present invention contemplates a family of quaternary ammonium esters which are derived from ether alkanolamines. Said quaternary ammonium esters are of the general formula:
>
> $$(R - \overset{\overset{O}{\|}}{C} - X)_n N^+ - (Q)_{4-n} \quad Z^-$$
>
> n is an integer of 1or 2, R is a C_5 to C_{23} straight or branched chain,
> (Specification, page 12, lines 3-9)

Amended claims 50, 65 and 75 recite in part, wherein the fatty acid is a C_{16}-C_{22} fatty acid

having an iodine value from about 45 to 60."

Amended claims 51 and 76 recite in part, wherein the fatty acid is C_{16}-C_{22} fatty acid having an iodine value from about 45 to 55."

Support for fatty acids of carbon number and iodine value in Applicant's claims is found in Applicant' specification in the above-cited pages and the below cited paragraphs,

> The quaternary ammonium compounds which are reacted with the smectite clays to produce the organoclays of the present invention are high in diester and low in triester content. They are obtained by reaction of C_{12} - C_{22} fatty acids or the hydrogenation products thereof, or a mixture of such acids, with an alkanolamine in the presence of an acid catalyst, wherein the ratio of fatty acid to alkanolamine is from about 1.40 to 2.0. The resultant ester amine reaction products are subsequently quaternized to obtain quaternary ammonium salts for reaction with the smectite. The fatty acid is preferably a C_{16} - C_{22} acid containing a degree of unsaturation such that the iodine value ("IV") is in the range of from about 3-90, preferably, from about 20-90, more preferably in the range of 40-60 and still more preferably in a range of from about 45-55.
> (Specification, page 6, lines 15-25).

Claims 55 and 80 have been objected to as containing new matter. Claims 55 and 80 have been amended for clarification.

Claims 59 and 84 have been objected to as not having a charged on the nitrogen atom. Claims 59 and 84 have been amended for clarification.

Claims 60-62, 85-87, 89, 90 were objected as having no support in the specification for the lower amount of carbon atoms. Claims 60-62 and 85-87 have been canceled. Support for the carbon number in claims 89 and 90 and is found in the above-cited pages and pages cited below in Applicant's specification, which states,

> In an embodiment, the preparation of a high diester quaternary ammonium mixture comprises reacting:
>
> I) a C_{11} to C_{23} substituted or unsubstituted fatty acid or mixture of fatty acids
> (Specification, page 13, lines 8-11).

Claims 58, 59, 83 and 84 state in part, "and Z- represents a halogen or sulfate." Support for sulfate is found in Applicant's specification, which states,

> The esterification of fatty acids with alkanolamines is carried out at a temperature of from about 170° -250°C until the reaction product has an acid value of below 5. After the esterification, the crude product is reacted with alkylating agents in order to obtain the quaternary ammonium product. Preferred alkylating agents include C_1 - C_3 straight or branched chain alkyl halides, phosphates, carbonates, or sulfates, C_7 - C_{10} aralkyl halides, phosphates or sulfates, and mixtures thereof. Examples of preferred alkylating agents include but are not limited to methyl chloride, benzyl chloride, diethyl sulfate, dimethyl carbonate, trimethyl phosphate, dimethyl sulfate or mixtures thereof. Choosing the type and amount of alkylating agent employed is well within the skill of one in the art."
> (Specification, page 7, line 27 through page 8 line 5) and
>
> ...and Z^- represents a softener compatible anion including, but not limited to, halogen, CH_3SO_4 or $C_2H_5SO_4$.
> (Specification, page 10, lines 15-16).

Applicant submits that the sulfate disclosure is specific enough to lead one having ordinary skill in the art to the class of sulfates. Use of known chemical compounds in a manner auxiliary to the invention must have a corresponding written description only so specific as to lead one having ordinary skill in the art to that class of compounds. Occasionally, a functional recitation of those known compounds in the specification may be sufficient as that description. *In re Herschler*, 591, F2d 693, 697, 200 USPQ 711, 714 (CCPA 1979).

Applicant submits claims 1, 4-13, 15-20 31-33, 35-41, 45, 48-69, 63-84 and 88-111 are described in the specification pursuant to 35 U.S.C. § 112, first paragraph.

D. The Claims Are Not Indefinite Pursuant To 35 U.S.C. § 112, Second Paragraph

Claims 48-111 were rejected under 35 U.S.C. § 112, first paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant respectfully disagrees.

Claims 48, 50, 51, 58-62, 64, 65, 73, 75-76, 83-87, 89-90 were rejected as being

indefinite. The Examiner states, "use of term "substituted" renders claim indefinite, since the specification does not reasonably define what the substituents exactly are (sic)..." (Office Action, page 5). Applicant respectfully disagrees with the rejection, however to expedite prosecution of the application, Applicant has amended claims 48, 50, 51, 58-59, 64-65, 73, 75-76, 83-84 and 89-90 for clarification. Claims 60-62 and 85-87 have been canceled.

Claims 57 and 82 were rejected as being indefinite for containing an improper Markush language. Applicant has amended claims 57 and 82 for clarification.

Applicant submits claim 48, 50, 51, 57-59, 64-65, 73, 75-76, 82-84 and 89-90 are definite pursuant to 35 U.S.C. § 112, Second Paragraph.

E. Summary

Based on the above, Applicant respectfully requests favorable reconsideration.